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(54) VAGINAL DILATOR HAVING SIDE BLADE OR HAVING UPPER AND LOWER BLADES COMPRISING ACCESSORIAL BLADES

(57) A vaginal dilator having side blades or having upper and lower blades comprising accessorial blades includes an upper blade (1), a press handle (3), a lower blade (2) and a handle (4). The upper blade (1) is connected with the lower blade (2) by a pin (5). The press handle (3) is engaged with the handle (4) by a first dilating fixation device. The vaginal dilator having side blades also includes a circular-arc movable locating sleeve (8) rotationally connected with the upper blade (1). Each end of the sleeve (8) is provided with a mounting base (11). The mounting base (11) is provided with a joint cavity for receiving a side blade (12) which can be retracted between the upper and lower blades (1, 2). The back portion of the side blade (12) is provided with a second dilating fixation device engaged with the back end of the upper blade (1) or a locating buckle (15) of the mounting base (11). A channel (18), a channel cover and a slot for inserting the channel cover are provided in the side blade (12). The vaginal dilator having upper and lower blades comprising accessorial blades also includes an upper accessorial blade (36) and a lower accessorial blade (37). The upper accessorial blade (36) and the lower accessorial blade (37) are arranged on the internal faces of the upper blade (1) and the lower blade (2) respectively. A channel (30) is provided within the upper and lower accessorial blades (36, 37). The vaginal dilator having side blades can be dilated and fixed in the up-down and left-right directions so as to provide a bigger field of vision. The vaginal dilator having side blades or having upper and lower blades comprising accessorial blades has advantage of high smoke emission ability, facilitating assembling lighting equipment or a camera device etc, simple structure and easy manufacture.

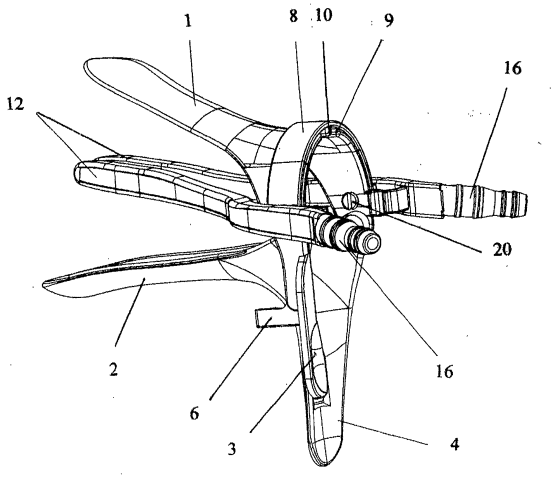

Fig. 1

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Description

[0001] This PCT international application claims the priorities of Chinese invention patent applications No. 201010227014.9 and No. 201010227012.X filed on July 14, 2010, the contents disclosed in which are incorporated hereinto by reference.

FIELD

[0002] The present invention relates to a vaginal dilator, particularly to a vaginal dilator having side blades or having upper and lower blades comprising accessorial blades.

BACKGROUND

[0003] A vaginal dilator is a conventional examination and operation instrument in gynecology and obstetrics for exposing examination or operation areas. A conventional vaginal dilator comprises an upper blade and a lower blade, which can be opened and closed and present in duckbilled shape. Keeping upper and lower blades to dilate a certain angle by means of a locating device or a dilating fixation device on the dilator, doctors can watch, examine and operate through the sight range, which is obtained by dilating the upper and lower blades. In fact, it reduce the exposed extent, leading to difficulty for examination or operation that the upper and lower blades are restricted by their own widths and the vaginal walls between two sides of the upper and lower blades backfill the dilated areas, It will bring more pain to a patient and also increase backfill of the vaginal walls that the dilated angle between the upper blade and the lower blade is increased, therefore, this is not a good countermeasure.

[0004] Directing at the above drawbacks in the prior art, the PCT international application No. PCT/AU98/00737 has disclosed a speculum, the solution suggested by this application is that a speculum comprises a main body with two dilating fingers 14A, 14B, which are connected at their respective proximal ends to the main body, a further dilating finger 28 extends between the above-mentioned fingers and is fixed to the main body, an actuator is pivotally connected to the main body, the actuator is formed with a dilating finger 70 which faces the fixed finger 28 locating between the fingers 14A and 14B, when the actuator is pivoted, this finger immediately starts to pivot away from the other fingers, after the actuator rotates for a certain degrees, it comes into contact with the inside of the fingers 14 near their proximal ends, so as to cause the distal ends of those fingers to move away from each other, Fingers 14A and 14B are hinged around a canted hinge axis so that they move in a combined motion upward and sideways when they are abutted by the actuator. Chinese patent No. 200620133849.7 has disclosed "a speculum having four blades used in gynecology", the solution suggested is that the four blades are rotatably fixed on a handle in uniform distribution by means of pivots, which are connected to circle holes locating on upper portion of the handle, the simultaneous opening or closing of the four blades is performed by a controlling device provided by this patent. Chinese patent No. 200820080747.2 has disclosed "a speculum having several blades used in gynecology", what is different from the former is that there may be three or four blades, but the way of connection to the handle is same. Chinese patent No. 200620172721.1 has disclosed a "speculum for uterine neck having multiple pages", the solution of the speculum disclosed in this patent is different from the ones in the above three patents, and includes an upper page of duckbill and a lower page of duckbill, and a pivot provided on a side of the lower page of duckbill and a rotating page connecting to the lower page of duckbill, so as to realize the vaginal expansion in three directions upward, downward and sideward.

[0005] The above four patents have made contributions to overcome the drawbacks in the prior art. However, there is a drawback existing in the former three patents that the side blades are all arranged on outside of the upper and lower blades and cannot be retracted into inside of the upper and lower blades, thereby bring pain to a patient when a dilator or speculum enters into vagina; although the fourth patent has made up the drawback of the former three patents to a certain extent by providing a side blade inside a lower blade, there is a drawback for itself of having only a side blade which acts only as a function of obstructing rather than dilating vaginal walls when using.

[0006] On the other hand, with rapid popularization of the electronic colposcopes quite a number of women patients who get diseases of uterine neck need employing a loop electrosurgical excision procedure (LEEP) for cervical cancerprecursor. A harmful smoke with an empyreumatic and unpleasant smell, which stimulates throat, can generate when performing operation, it influences health of doctor and patient, and meanwhile obscures sight line of doctor.

[0007] Chinese patent application No. 200810107219.6 has disclosed "a disposable vaginal dilator having two protecting blades with discharging smoke type", which includes upper and lower blades, a smoke pipe, which communicates with a smoke device, is provided on an inside of the upper blade, the upper and lower blades are provided with protecting wings, which can be ones with a type of elastic silicon sleeves, or a type of elastic aliform or a folding type similar to accordion. The wings act as barriers for preventing exposed vaginal walls between upper wing and lower wing from risk of suffering scorching hot and cannot play the role of dilating vaginal walls, when performing the operation with the LEEP. The upper wing is provided with a smoke pipe, the smoke pipe is a pipe sealed around except both ends thereof being communicating with each other and does not have a channel cover, saying nothing

of opening the channel cover. An operator cannot install mini-instruments, such as LED, camera, etc., under looking in the eye.

[0008] Chinese patent application No. 00232603.5 has disclosed a "disposable vaginal speculum with a fasten-closing type", in which an electric light source with an outgoing wire and a joint is provided on inside of an upper blade near the root thereof, the electric light source can connect to the lamp socket by screw, and a pipe for eliminating smoke is provided on a lower blade and a handle, Wherein the pipe for eliminating smoke can be made be integrated with the lower blade, besides that lower end of the smoke pipe connects to a negative pressure suction tube by a hosepipe, or a hard elbow can be fixed on the lower blade. There is a drawback for it that the electric light source with the outgoing wire and the joint present an unsafe risk as regards medical apparatus, even if a part of the source is not within inside of the sealed pipe, and does not possess the clinical applicability. If the electric light source is entirely installed within the pipe, because the pipe described in this patent and the pipe for eliminating smoke are both sealed around them rather than a close match of a channel cover which can be opened and closed with a channel of the pipe, up to now, such a long and bended pipe for eliminating smoke on the lower blade cannot be made by means of a plastics mould and present the difficulty of demoulding, so as to limit the practical applicability.

[0009] Chinese patent application No. 200720038815.4 has disclosed a "vaginal dilator with a structure of discharging smoke", the inside of upper duckbill blade is provided with a pipe for discharging smoke, and several through-holes are arranged on body of the pipe for discharging smoke, The through-holes are arranged on base of front end of the body of the pipe for discharging smoke, the distal end of which extends to tail of the duckbill. Although the structure described in this patent is more improved in comparison with the one having two pipes being sealed around them in that several through-holes are arranged on the body of the pipe for eliminating smoke, i.e., each of the through-holes is arranged at a distance on the pipe for discharging smoke, instead of the channel cover, which can be opened entirely, the "several through-holes" arranged on the vaginal dilator with the structure of discharging smoke can only be used for discharging smoke, does not possess the functions that the whole channel cover can be opened and the operator can rapidly and accurately install devices such as LED lamp, camera, etc., under looking in the eye, so as to increase a lot of clinical utility functions of the vaginal dilator, furthermore, there is only one pipe for discharging smoke, this is adverse to rapidly discharge toxic smoke, and also cannot achieve the function and effect that the several pipe channels can discharge smoke in cooperation.

[0010] Similarly, American patent No. US 6,432,048 B1 has disclosed a vaginal dilator with a lateral walls retractor, the function of the lateral walls retractor is that the vaginal dilator is dragged under condition of keeping vaginal tissue loose in a lateral direction, and the retractor does not form a channel for discharging smoke.

[0011] In another aspect, with development of the clinical medicine, it is required that the positions to be examined and performed operations can be more clearly observed and are supplied with real-time images to meet needs of diagnosis and teaching, for this purpose, it is necessary to be required that a channel and a channel cover for installing devices of illumination or camera, etc., are provided within the vaginal dilator and openings are arranged on the front and back ends, in other words, Only when possessing the three essential elements, i.e., a channel, a channel cover and openings which are arranged on the front and back ends, it can be realized that the devices of illumination, camera, etc., can be installed accurately, reliably, rapidly and conveniently, and the clinic uses can be safe and effective.

[0012] Furthermore, up to now, there has been no a kind of vaginal dilator having side blades or upper and lower blades having accessorial blades, in which illumination as well as camera devices, etc., can be installed by providing channel, channel cover and openings being arranged on front and back ends thereof and which can discharge smoke with multi-purpose for one pipe, or simultaneous use for several pipes, or single use for each of the pipes.

SUMMARY

[0013] The object of the present invention is to provide a vaginal dilator which can achieve that two side blades can be retracted into between the upper blade and the lower blade before the side blades enter into vagina, so as to avoid that the side blades exposed outside the upper and lower blades lead to harm and pain of the vaginal walls and having no clinical safe, and when use, each of the vaginal walls can be dilated effectively so as to obtain a necessary clinical field of vision for more facilitating and more rapidly discharging harmful smoke produced during operations and which can be provided with a channel for installing illumination or camera devices, etc. a channel cover and a slot, which is arranged on edge of the channel body, for embedding the channel cover.

[0014] To achieve the above-mentioned object, according to an aspect of the present invention, a vaginal dilator having side blades is provided, which includes an upper blade; a press handle, which is integrated with the upper blade and extends downward along a side of the upper blade in a direction with an obtuse-angle relative to it; a lower blade; and a handle, which is integrated with the lower blade and extends downward along a side of the lower blade in a direction with an approximate right-angle relative to it, two sides of back ends of both upper and lower blades are connected through pins, the press handle and the handle are engaged through a first dilating fixation device, characterized in that said vaginal dilator further includes a circular-arc movable locating sleeve

and at least a side blade, two ends of the movable locating sleeve connect to the shaft-holes on the two sides of the back end of the upper blade through pins of the movable locating sleeve, a mounting base is provided on each of outsides of the two ends of the movable locating sleeve respectively, the mounting bases connect to the middle-upper portions of the side blades through a joint structure, so that the side blades can be pivotally retracted or horizontally dilated between the upper blade and the lower blade, the back portion of each of the side blades is provided with a second dilating fixation device, which engages with the each of locating buckles, which are arranged on the back end of the upper blade or the mounting bases; wherein at least a side blade is provided with a channel.

[0015] More perfectly, each of the side blades has a front portion and a back portion, said front portion is longer than the back portion, said joint structure includes a joint axis, which is formed by means of that inside of a middle portion near top of the side blade extends radial-inward, and a joint cavity, which is formed on each of the mounting bases, the joint axes and the joint cavities are matched each other (can be detachable or undetachable) so that the side blades pivot relative to the mounting bases. More perfectly, said side blades have at least an inner channel, the front ends and/or the insides thereof are provided with at least an opening being communicated with the inner channel.

[0016] More perfectly, said inner channel is composed of a channel body and a channel cover.

[0017] More perfectly, said inner channel is composed of a channel body and a channel cover, a slot used for embedding the channel cover is formed at edges of the channel body.

[0018] More perfectly, said pins of the movable locating sleeve drive the side blades to rotate upward or downward through the rotation of the shaft-hole of the upper blade, or move the side blades so as to regulate the upper and lower positions thereof through rotation of the joint structure together with the movable locating sleeve.

[0019] More perfectly, a limit slot is arranged on the middle portion at the back end of upper blade, a limit block is arranged correspondingly at inside of the middle portion of the movable locating sleeve, the movable locating sleeve and the side blades can limit through the limit block the maximum range, within which the movable locating sleeve and the side blades rotate downward.

[0020] More perfectly, said first dilating fixation device comprises at least a locating hook and locating buckle respectively on the press handle and the handle, and the locating hook and the locating buckle can be interchangeable.

[0021] More perfectly, said first dilating fixation device comprises a locating plate, which is arranged on the press handle and has an arc-shaped slot, and can rotate around a pin, which is as a rotating center and connects the upper and lower blades, the handle is provided with a locating rod, which is attached a nut and passes through the arc-shaped slot on the locating plate.

[0022] More perfectly, said second dilating fixation device comprises at least a locating hook on the back portions of the side blades, and at least a locating buckle on the back end of the upper blade or the mounting bases, and the locating hooks and locating buckles can be interchangeable.

[0023] More perfectly, said second dilating fixation device comprises a screw, which is provided on inside of the back end of the side blade and extends inward, the screw passes through the locating buckle, which protrudes upward from the back end of the upper blade or the mounting base, the screw and locating buckle are fixed by a nut.

[0024] More perfectly, each of said blades comprises a front portion and a back portion, between which there is a middle portion being recessed inward, and appears in a bent strip entirely, a joint axis, which extends radial-inward and protrudes inward, is provided on the inside of the middle portion near the top, the joint axis and the joint cavity can be pivotally matched.

[0025] More perfectly, the front-middle portion of each of the side blades appears in an inward arc shape, the front end of the front portion is substantially flat and straight.

[0026] More perfectly, said front portion of each of the side blades appears in a duckbilled shape.

[0027] More perfectly, the front portion of each of the side blades appears in a rounded shape.

[0028] After end of examination and operation, the dilating fixation device, which engages the locating buckles, which are arranged on back portion of the side blades and the back end of the upper blade or on the mounting bases, is loosened, the left and right blades are retracted into insides of the upper and lower blades, then the first dilating fixation device is disengaged the upper and lower blades are retracted and then the vaginal dilator having side blades is taken out from vagina.

[0029] According to another aspect of the present invention, a vaginal dilator having upper and lower blades comprising accessorial blades is provided, which includes an upper blade and a press handle, which is integrated with the upper blade and extends downward from a back end thereof along a direction with obtuse-angle relative to it, a lower blade, and a handle, which is integrated with the lower blade and extends downward from a back end of the lower blade in a direction with an approximate right-angle relative to it, two sides of the back ends of the upper and lower blades are connected through pins, the press handle and the handle are engaged through a dilating fixation structure; characterized in that said vaginal dilator further includes upper and lower accessorial blades, which are received on inside faces thereof respectively, each of the said upper and lower accessorial blades is provided with an inner channel, the inner channel includes a channel body and a channel cover matched with the channel body, and/or the edges of the channel body form a slot, into which the channel

cover can be embedded, said channel comprises at least an opening facing the vagina.

[0030] After end of examination and operation, the dilating fixation device is disengaged, the upper and lower blades are retracted, and then the vaginal dilator having upper and lower blades comprising accessorial blades is taken out from vagina.

[0031] It should be pointed out that the technicians in the art can easily appreciate that the above technical solution also can be applied to a vaginal dilator comprising upper and lower and side blades, though the above technical solution only refers to a vaginal dilator having upper and lower blades.

[0032] The side blades of the present invention can be designed as a left blade and a right blade, but a left side blade or a right side blade, or both two side blades can be installed based on the clinical need; and the left and right side blades can be added with an additional upper accessorial blade, or a lower blade, or both the upper and lower accessorial blades, which are installed based on the clinical need.

[0033] Adopting the vaginal dilators according to the above-mentioned solutions of the present invention, when using, the vaginal dilator is inserted into vagina under the condition that the upper and lower blades are closed and the side blades are retracted between the upper and lower blades, the upper and lower blades are opened to a needed field of vision by controlling the handle and press handle, the extent of the field of vision are kept through the first dilating fixation device, then the back ends of the left and right side blades are controlled to move in opposite direction so as to dilate the two side blades up to a needed field of vision, then the second dilating fixation device engages the locating buckles, which are arranged on back portion of side blades and back end of upper blade or on the mounting bases, at this moment, observation and examination and/or operation on vagina, cervix can be performed through the field of vision, which is obtained by dilating the upper and lower blades and the left and right blades.

[0034] Because the vaginal dilator of the present invention is provided with inner channels on the side blades or accessorial blades of the upper and lower blades, the invention provides the possibility that different use requirements can be achieved.

[0035] When the operation on vagina or cervix is performed by adopting an ultrahigh-frequency wave bistoury, the produced smoke can pass through the openings, which are arranged on insides of the left blade and/or the right side blade, and /or the openings, which are arranged on sides of upper and lower accessorial blades, pass through the pipes, which are installed in the inner channels and can be discharged through the negative pressure device connecting with the back end of the pipes. It is obvious that in comparison with the prior art, the vaginal dilator having upper and lower blades comprising accessorial blades according to the present invention is provided is additional channels for discharging smoke, which are arranged inside the left and right blades and lower accessorial blade, so that the smoke discharge is increased and accelerated, more availing the health of doctor and patient.

[0036] When examination and operation are performed by adopting the vaginal dilator according to prior art, the observation and operation are conducted by means a high-power illumination locating at outside site, therefore, the illumination to a examined and operated deeper positions within vagina is not very well. According to the vaginal dilator of the present invention, the side blades are provided with inner channels or external channels, the upper accessorial blade and lower accessorial blade are respectively provided with the inner channels, which are composed of channel covers and channels, or are composed of channel bodies, channel covers and slots, which are formed by edges of the channel bodies and are used for embedding the channel cover, therefore, the whole inner channels can be entirely exposed so long as the channels are opened, so that the illumination device, such as LED, can be very conveniently and accurately installed at the openings, which locates in the insides of the left side blade and/or right side blade and/or in the insides of the upper accessorial blade and/or the lower accessorial blade, the power supply lines can be pulled out and connect to a power source under look in the eye of the operator through inner channels, which are arranged inside the side blades and/or the upper accessorial blade and/or the lower accessorial blade and are exposed entirely, after installing, the channels are closed by the channel covers, so the examination and operation on deeper positions of vagina can be performed under the better illumination condition, because power source, power supply lines and devices are all installed within the channels, the conditions for examination and operation are improved and the safety and reliability are ensured.

[0037] Similar to the above-mentioned principle, Because a design for the channel covers is adopted, the vaginal dilator of the present invention can be installed with a camera at the opening of the channels, which are entirely exposed and are arranged in front ends or insides of the left side blade and/or the right side blade or upper accessorial blade and/or lower accessorial blade, it is possible to provide at real time the images of the positions to be examined or operated, whether adopting wire transmission or wireless transmission. This can meet the needs and requirements in contemporary medicine to provide real-time images, and the conditions necessary for clinic diagnosis, even remote consultation and teaching.

[0038] Just because a well design for the channel covers has been adopted, the channel covers can be opened to meet the requirements that the illumination or camera devices can be installed accurately, conveniently and rapidly under look in the eye of the operator and smoke can be discharged simultaneously after the channel covers and the channels are sealed. The multiple purposes

can be achieved.

[0039] Also just because a well design for the channel covers has been adopted, the upper and lower accessorial blades and the side blades, which are so long and bended, can be made of common plastics or degradation materials and can easily achieve demolding. The vaginal dilator can be disposable and possesses significant importance that the cross infection of iatrogenic diseases can be completely eradicated when the vaginal dilator is applied to operations, which are completed by adopting LEEP in early lesion of cervical cancer.

[0040] Furthermore, the upper accessorial blade can adopt a hook, which is provided in front of the back portion of the upper accessorial blade, the hook for upper accessorial blade is buckled into the limit slot on the middle portion of the back end of the upper accessorial blade so as to be fixed detachably; a fixation buckle is provided at the back of the back portion of the lower accessorial blade, the buckle for the lower accessorial blade can be buckled into a limit slot on the middle portion of the back end of the lower blade so as to be fixed detachably. The benefit of the detachable fixation above-mentioned lies in that the installation can be conducted immediately according to clinic requirements.

[0041] The present invention possesses prodigious flexibility and adaptability because the back portions of the side blades are provided with second dilating fixation devices, which engage the locating buckles, which are arranged on the back ends or the mounting bases, the left and right side blades can be installed with a left side blade or right side blade or both the left and right ones according to needs, furthermore, the left and right side blades can add an upper accessorial blade or a lower accessorial blade or both the upper and lower ones, which are installed according to the clinic needs.

[0042] Obviously, the vaginal dilator according to the present invention has overcome the drawbacks existing in the prior art, can achieve the required dilation in clinic when the dilator is inserted into vagina per the height and width, which are as same as or similar to the height and width of the dilator, which is provided only with an upper blade and a lower blade, and can reduce pain of a patient, and the accessorial blades to be provided can be hided within the insides of the upper and lower blades, so it does not bring pain to the patient because the accessorial blades are added so as to largen the overall dimension of the dilator or does not increase the cost of production

[0043] The vaginal dilator according to the present invention also possesses the advantages that the structure is simple, the manufacture is easy and the cost is low.

BRIEF DESCRIPTION OF THE DRAWINGS

[0044] The above and other objects and advantages of the vaginal dilator having side blades or upper and lower blades according to the present invention will be more clear and apparent through the following detailed description of embodiments in combination with the drawings, wherein :

Fig.1 is a perspective view from front sighting, showing an embodiment of a vaginal dilator having side blades according to the present invention;

Fig. 2 is a perspective view from top sighting of the vaginal dilator having side blades showed in fig.1;

Fig. 3 is a sectional view of the vaginal dilator having side blades showed in Fig. 2;

Fig 4 is a sectional view of another embodiment of a vaginal dilator having upper and lower blades comprising accessorial blades according to the present invention;

Fig. 5 is an enlarged view from a direction showed in fig. 4;

Fig. 6 is an enlarged view from B direction showed in fig. 4.

DETAILED DESCRIPTION

[0045] An embodiment of a vaginal dilator according to the present invention is described in combination with the drawings as follows. First referring to figs. 1 and 2, A vaginal dilator having side blades includes: an upper blade 1; a press handle 3, which is integrated with the upper blade 1 and extends downward along a side of the upper blade in an obtuse-angle direction; and a handle 4, which is integrated with the lower blade 2 and extends downward along a side of the lower blade 2 in an approximate right-angle direction, two sides of the back ends of both upper and lower blades are connected through pins 5, Therefore, upper blade 1 and lower blade 2 can be opened and closed by controlling the press handle 3.

[0046] A first dilating fixation device for fixing the opening condition of upper and lower blades 1 and 2, said first dilating fixation device further includes a locating hook plate which locates on a front end of the press handle 3 and extends to the left direction as showed in fig. 1, a locating hook which is situated on inside of the locating hook plate 6, and a locating buckle (is not showed), which locates on a handle 3 and position of which corresponds to the locating hook plate. According to another embodiment of the present invention, the first dilating fixation device, which locates between upper and lower blades, comprises a locating plate with an arc-shaped slot, which is arranged on the press handle and rotates around the pin 5, as a rotating center, the handle is provided with a locating rod with a nut passing through the arc-shaped slot on the locating plate.

[0047] A movable locating sleeve 8 with a circular arc shape is arranged on the outside of the back end of upper blade 1, and rotatably connects with the shaft hole of the upper blade 1 through the pins 20 on the two ends thereof, wherein, a limit slot is arranged on the middle portion at the back end of said upper blade 1, a limit block 10, the position of which corresponds to the limit slot, is arranged at inside of the movable locating sleeve 8.

[0048] Referring to fig. 3, each of outsides of the both

ends of the movable locating sleeve 8 is provided with a mounting base 11 respectively, At least a side blade is provided in the present invention. In this embodiment, there are two side blades, which are provided as a left blade and a right blade, which are of the same structure and arranged symmetrically, said joint structure includes a joint axle 13, which is formed on the middle and upper portion of the side blade 12, and a joint cavity, which is formed on each of the mounting bases 11, the joint axes and the joint cavities are matched each other so that the side blades 12 pivot relatively to the mounting bases.

[0049] According to an embodiment of the present invention, each of said blades 12 has a front portion and a back portion, between which there is a middle portion being recessed inward and appears in a bent strip entirely, a joint axle, which extends radial-inward and protrudes inward, is provided at the inside of the middle portion near the top, the joint axle and the joint cavity can be pivotally matched.

[0050] The front portion of each of the side blades 12 appears in an arc shape. According to another embodiment of the present invention, said front portion of each of the side blades appears in a duckbilled shape. According to further another embodiment, the front portion of each of the side blades appears in a rounded shape.

[0051] The vaginal dilator having side blades according to the present invention, a second dilating fixation device is provided between inside of the back portion of each of the side blades and the back ends of the upper blade or the mounting bases (not showed in the drawings). The second dilating fixation device is used for regulating and fixing the opening extent of the side blades. According to an embodiment of the present invention, a locating hook 14, which extends inward, is provided on inside of the back portion of each of the side blades 12, accordingly, a locating buckle 15, which engages with the locating hook 14, is provided on the back end of the upper blade 1 or the mounting base. The amount of the locating hook is at least one or more than one used for regulating the left-right dilating distance of the side blades, when the locating hook 14 and the locating buckle 15 are engaged each other, the opening condition of the left and right side blades 12 are fixed.

[0052] According to a second dilating fixation device of another embodiment of the present invention, a screw, which extends inward, is provided on inside of the back end of each of the side blade 12, the screw passes through the upper blade, the back end is provided with a locating plate, which has a slot with an arc shape and can be rotated around a pin 20 as a rotating center, and a nut is provided on the screw. The side blades and upper blade are connected firmly by screwing the nut, so as to achieve the dilation and fixation of the side blades.

[0053] It is not difficult to understand that the back ends of the side blades 12 are actually the handles for controlling the side blades 12 to operate.

[0054] According to an embodiment of the present invention, inside of each of the said side blades 12 has an inner channel 18, at least an opening, which are communicate with the channels, are provided on each sides except the outside of the front end of side blades 12, such as inside, upper side or lower side, It has no use value that the opening of the channel is provided on the outside because the outside attaches the vaginal wall when the side blades are expanded.

[0055] In the side blades the channels can be or not provided with channel cover. If channel covers are provided on the channels, then the edge of the channel body can best have a slot used for embedding the channel cover into it, in order to achieve the seal-connection.

[0056] In a vaginal dilator having upper and lower blades comprising accessorial blades, the channel of each accessorial blades is composed of a channel body and an accessorial blade cover thereon, the edges of the channel body are formed with a slot, into which the channel cover can be embedded, so as to rapidly, accurately and safely conduct, for example, installing LED and laying power lines and simultaneously exhaust smoke.

[0057] According to an embodiment of the present invention, the back end of each of the side blades can be formed as pipe joints 16 when the channels are used for exhausting smoke, for easy to connect a negative pressure device 21 through hoses (including a single-pass, double-pass, three-pass and multi-purpose hoses), as showed in fig. 3.

[0058] A vaginal dilator having upper and lower blades comprising accessorial blades according to another embodiment of the present invention will be described in combination with drawings as follows. First referring to fig. 4, the vaginal dilator includes: an upper blade 1, a press handle 3, which is integrated with the upper blade 1 and extends downward from a back end thereof along an obtuse-angle direction; a lower blade 2, a handle 4, which is integrated with the lower blade 2 and extends downward along a back end thereof in an approximate right-angle direction, two sides of the back ends of both upper and lower blades 1 and 2 are connected through pins 5, therefore, the upper blade 1 and lower blade 2 can be opened and closed by controlling the press handle 3.

[0059] A dilating fixation device for fixing dilating condition of upper blade 1 and lower blade 2 further includes: a locating hook plate, which locates on the front end of the press handle 3 and extends to the left side direction showed in fig. 1, a locating hook 6 locates at inside of the locating hook plate, and a locating buckle, which is provided on the handle 4 and corresponds to the position of the locating hook 6 (not showed). A dilating fixation device according to another embodiment of the present invention, the dilating fixation device locating between the upper blade and lower blade includes: a locating plate having a slot with arc shape, which rotates around a pin 5 as a rotating center, is provided on the press handle, a locating rod, which is provided with a nut and on the handle and passes through the slot with arc shape on the locating plate.

[0060] Continuing to refer to fig. 4, the front ends of the upper accessorial blade 36 and lower accessorial blade 37 are "invisibly" provide on the inside of the upper and lower blades 1 and 2. Wherein a plural of bumps 28 arranged on outer edges of the upper and lower accessorial blades 36 and 37, accordingly, a plural grooves 29 are arranged on the outer edges of insides of the upper and lower blades 1 and 2 at the positions corresponding to of the bumps 28, fit of the bumps 28 and grooves 29 makes the upper and lower accessorial blades 36 and 37 be integrated with the upper and lower blades respectively (see figs 5 and 6). According to an embodiment of the present invention, Each outer edge of the upper and lower blades 36 and 37 is provided with a plural of snaps, correspondingly, each of the upper and lower blades 1 and 2 is provided with snapper seats for receiving said snappers, so as to respectively connect the upper and lower accessorial blades 36 and 37 to the upper and lower blades 1 and 2 together. According to further an embodiment of the present invention, the upper and lower accessorial blades 36, 37 connect to the upper and lower blades 1, 2 by binder or weld. According to another embodiment of the present invention, the back of the upper accessorial blade near font of top thereof is provided with a hook for upper accessorial blade, which snaps into a limit slot on the middle of the back-end of the upper blade so as to be fixed detachably. And/or the back of the lower accessorial blade is provided a buckle 39 for lower accessorial blade, which buckles into a limit slot 40 on the back of the lower blade so as to be fixed detachably. Continuing to refer to fig.4, which further illustrates the channels 30 on the upper and lower accessorial blades 36, 37, which is composed of the channel body 31 and the channel cover 34. Wherein the size and shape of the channel body 31 is designed to appear that the longitudinal is longer than the transverse, the section is of U shape, inverted Π shape or circle of a frustum. At least a hole 35 (showed respectively two in the figure) are arranged on the sides facing vagina of the channel bodies 31 of the upper and lower accessorial blades 36, 37. The axial front end of the channel body 31 can be closed or opened, an opening 33 is arranged on the back end and connects with a pipe 32 (shown in dotted line in the figure). A slot, which is used for receiving the channel covers 34, is arranged on periphery corresponding to the holes 35. The channel cover 34 is long and thin and has the same shape as the groove on the channel bodies 31. When the channel cover 34 is embedded into the groove of the channel body, the channel is formed so as to constitute a passageway, which is composed of the holes 35 on the channel body, the channel body 31, the channel cover 34 and the opening 33 on the back end of the channel body. When the channel 30 is used for exhausting smoke, the smoke enters into the holes 35, passes through the above passageway, pipe 32 and then exhausts from the negative pressure device (not showed) connecting to the pipe. When having need to install a lighting or camera devices, the operator can open the channel cover, then accurately, rapidly and conveniently installs LED light or camera into holes 35 on the channel body 31 under look in the eye, make the supply lines or signal lines pass through channel 30, opening 33 on the channel body 31 and connect to outside.

[0061] According to an embodiment of the present invention, the channel body 31 of the channel and the upper and lower accessorial blades 36, 37 can be formed together by injection molding or stamping.

[0062] According to an embodiment of the present invention, the upper and lower accessorial blades 36, 37 and the channel body 31 can be formed respectively and then connected together by bonding or weld.

[0063] The vaginal dilator of the present invention can be made by stainless steel, plastics, environmental protection material or similar material, but not limited hereto.

[0064] The above specific description about the conception and embodiments of the present invention has been made. However, the technicians in the art can make various modifications and improvements based thereon, these modifications and improvements do not depart from the spirit of the present invention and all are within the protection scope defined by claims.

Claims

1. A vaginal dilator having side blades, including: an upper blade; a press handle, which is integrated with the upper blade and extends downward along a side of the upper blade in a direction with an obtuse-angle relative to it; a lower blade; and a handle, which is integrated with the lower blade and extends downward along a side of the lower blade in a direction with an approximate right-angle relative to it, two sides of the back ends of both upper and lower blades are connected through pins, the press handle and the handle are engaged through a first dilating fixation device, **characterized in that** said vaginal dilator further includes a circular-arc movable locating sleeve and at least a side blade, two ends of the movable locating sleeve connect to the shaft-holes on the two sides of the back end of the upper blade through pins of the movable locating sleeve, a mounting base is provided on each of outsides of the two ends of the movable locating sleeve respectively, the mounting bases connect to the middle-upper portions of the side blades through a joint structure, so that the side blades can be pivotally retracted or horizontally dilated between the upper blade and the lower blade, the back portion of each of the side blades is provided with a second dilating fixation device, which engages with the each of locating buckles, which are arranged on the back end of the upper blade or the mounting bases; wherein at least a side blade is provided with a channel.

2. A vaginal dilator having side blades according to

claim 1, **characterized in that** each of the side blades has a front portion and a back portion, said front portion is longer than the back portion, said joint structure includes a joint axis, which is formed by means of that inside of a middle portion near top of the side blade extends radial-inward, and a joint cavity, which is formed on each of the mounting bases, the joint axes and the joint cavities are matched each other, so that the side blades pivot relative to the mounting bases..

3. A vaginal dilator having side blades according to claim 1, **characterized in that** said side blades have at least an inner channel, the front ends and/or the insides thereof are provided with at least an opening being communicated with the inner channel.

4. A vaginal dilator having side blades according to claim 1, **characterized in that** said inner channel is composed of a channel body and a channel cover, a slot used for embedding the channel cover is formed at edges of the channel body.

5. A vaginal dilator having side blades according to claim 1, **characterized in that** said pins of the movable locating sleeve drive the side blades to rotate upward or downward through the rotation of the shaft-hole of the upper blade, or move the side blades so as to regulate the upper and lower positions thereof through rotation of the joint structure together with the movable locating sleeve.

6. A vaginal dilator having side blades according to claim 1, **characterized in that** a limit slot is arranged on the middle portion at the back end of upper blade, a limit block is arranged correspondingly at inside of the middle portion of the movable locating sleeve, the movable locating sleeve and the side blades can limit through the limit block the maximum range, within which the movable locating sleeve and the side blades rotate downward.

7. A vaginal dilator having side blades according to claim 1, **characterized in that** said first dilating fixation device comprises at least a locating hook and locating buckle respectively on the press handle and the handle, and the locating hook and the locating buckle can be interchangeable.

8. A vaginal dilator having side blades according to claim 1, **characterized in that** said first dilating fixation device comprises a locating plate, which is arranged on the press handle and has an arc-shaped slot, and can rotate around a pin, which is as a rotating center and connects the upper and lower blades, the handle is provided with a locating rod, which is attached a nut and passes through the arc-shaped slot on the locating plate.

9. A vaginal dilator having side blades according to claim 1, **characterized in that** said second dilating fixation device comprises at least a locating hook on the back portion of the side blades, and at least a locating buckle on the back end of the upper blade or the mounting bases, and the locating hooks and locating buckles can be interchangeable

10. A vaginal dilator having side blades according to claim 1, **characterized in that** said second dilating fixation device comprises a screw, which is provided on inside of the back end of the side blade and extends inward, the screw passes through the locating buckle, which protrudes upward from the back end of the upper blade or the mounting base, the screw and locating buckle are fixed by a nut.

11. A vaginal dilator having side blades according to claim 1, **characterized in that** each of said blades comprises a front portion and a back portion, between which there is a middle portion being recessed inward, and appears in a bent strip entirely, a joint axis, which extends radial-inward and protrudes inward, is provided on the inside of the middle portion near the top, the joint axis and the joint cavity can be pivotally matched

12. A vaginal dilator having side blades according to claim 11, **characterized in that** the front-middle portion of each of the side blades appears in an inward arc shape, the front end of the front portion is substantially flat and straight.

13. A vaginal dilator having side blades according to claim 11, **characterized in that** said front portion of each of the side blades appears in a duckbilled shape.

14. A vaginal dilator having side blades according to claim 11, **characterized in that** the front portion of each of the side blades appears in a rounded shape.

15. a vaginal dilator having upper and lower blades comprising accessorial blades is provided, which includes an upper blade and a press handle, which is integrated with the upper blade and extends downward from a back end thereof along a direction with obtuse-angle relative to it, a lower blade, and a handle, which is integrated with the lower blade and extends downward from a back end of the lower blade in a direction with an approximate right-angle relative to it, two sides of the back ends of the upper and lower blades are connected through pins, the press handle and the handle are engaged through a dilating fixation structure; **characterized in that** said vaginal dilator further includes upper and lower accessorial blades, which are received on inside faces thereof respectively, each of the said upper and low-

er accessorial blades is provided with an inner channel, the inner channel includes a channel body and a channel cover matched with the channel body, and the edges of the channel body form a slot, into which the channel cover can be embedded, said channel comprises at least an opening facing the vagina.

16. A vaginal dilator according to claim 15, **characterized in that** the back of the upper accessorial blade near font of top thereof is provided with a hook for upper accessorial blade, which snaps into a limit slot on the middle of the back-end of the upper blade so as to be fixed detachably.

17. A vaginal dilator according to claim 15, **characterized in that** the back of the lower blade near the underneath of end is provided at least a buckle for a lower accessorial blade, which buckles into a limit slot on the middle of the back end of the lower blade so as to be fixed detachably.

18. A vaginal dilator according to claim 15, **characterized in that** each outside of the upper and lower blades is provided with an or plural of bumps, and each inside of the upper and lower blades is provided with an or plural grooves for receiving said bumps correspondingly.

19. A vaginal dilator according to claim 15, **characterized in that** each outside of the upper and lower blades is provided with an or plural of snaps, each inside of the upper and lower blades is provided with an or plural of the snapper seat for receiving said snappers.

20. A vaginal dilator according to claim 15, **characterized in that** the front end of the channel body is closed or opened, the back end is opened, the section thereof is of an U-shape, a shape of inverted mouth or circular shape of a frustum.

21. A vaginal dilator according to claim 15, **characterized in that** the back end of the channel is provided with a pipe which is connected thereto, including a single-pass, double-pass, three-pass and multi-purpose pipeline.

22. A vaginal dilator according to claim 15, **characterized in that** said dilating fixation device includes the locating hook on the press handle and the locating buckle on the handle, and the locating hook and the locating buckle are interchangeable.

23. A vaginal dilator according to claim 15, **characterized in that** said dilating fixtures device includes: a locating plate, which is provided on the press handle having a slot with arc shape, which can rotate around a pin as a rotating center, which connects the upper and lower blades, a locating rod, which is provided with a nut and on the handle and passes through the slot with arc shape on the locating plate.

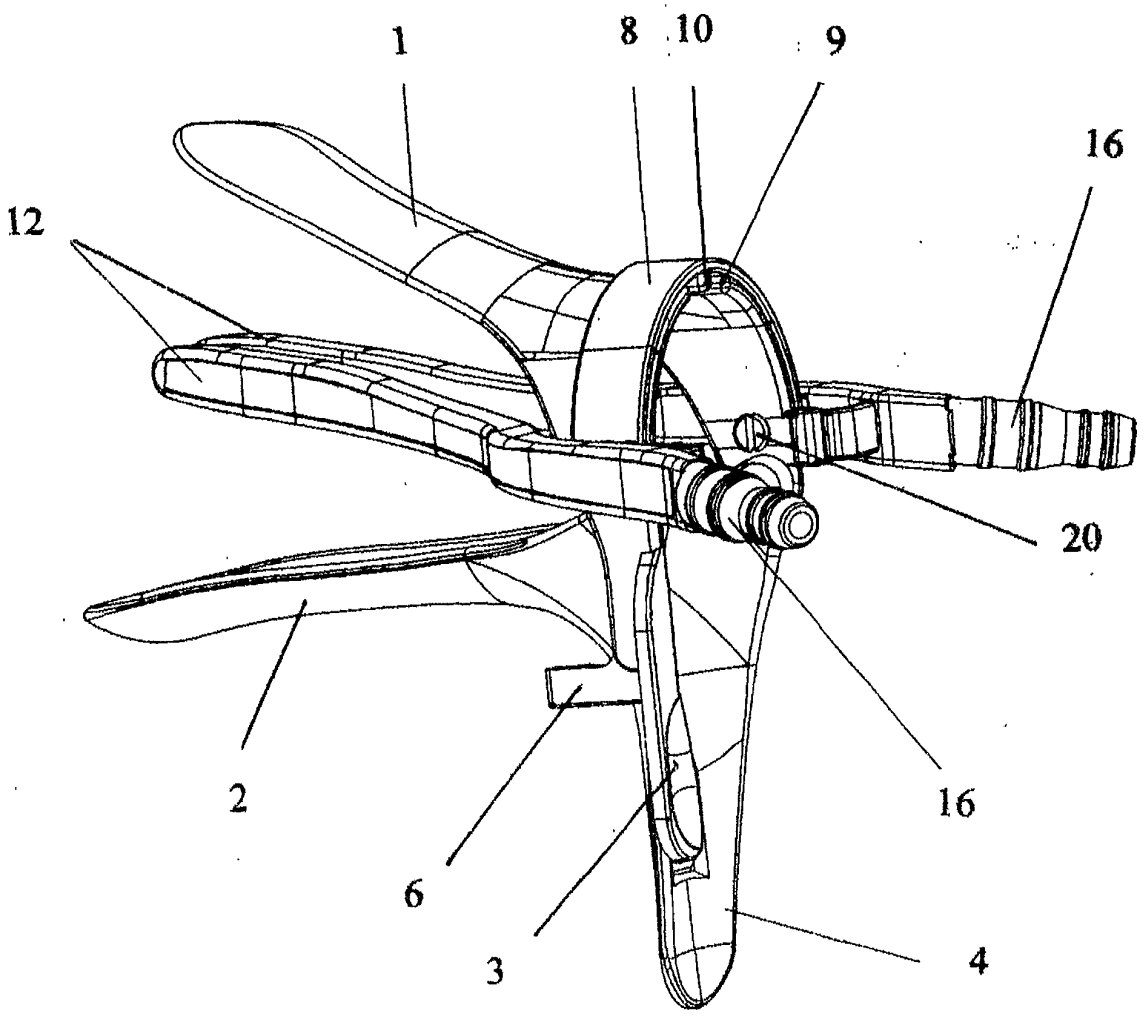

Fig. 1

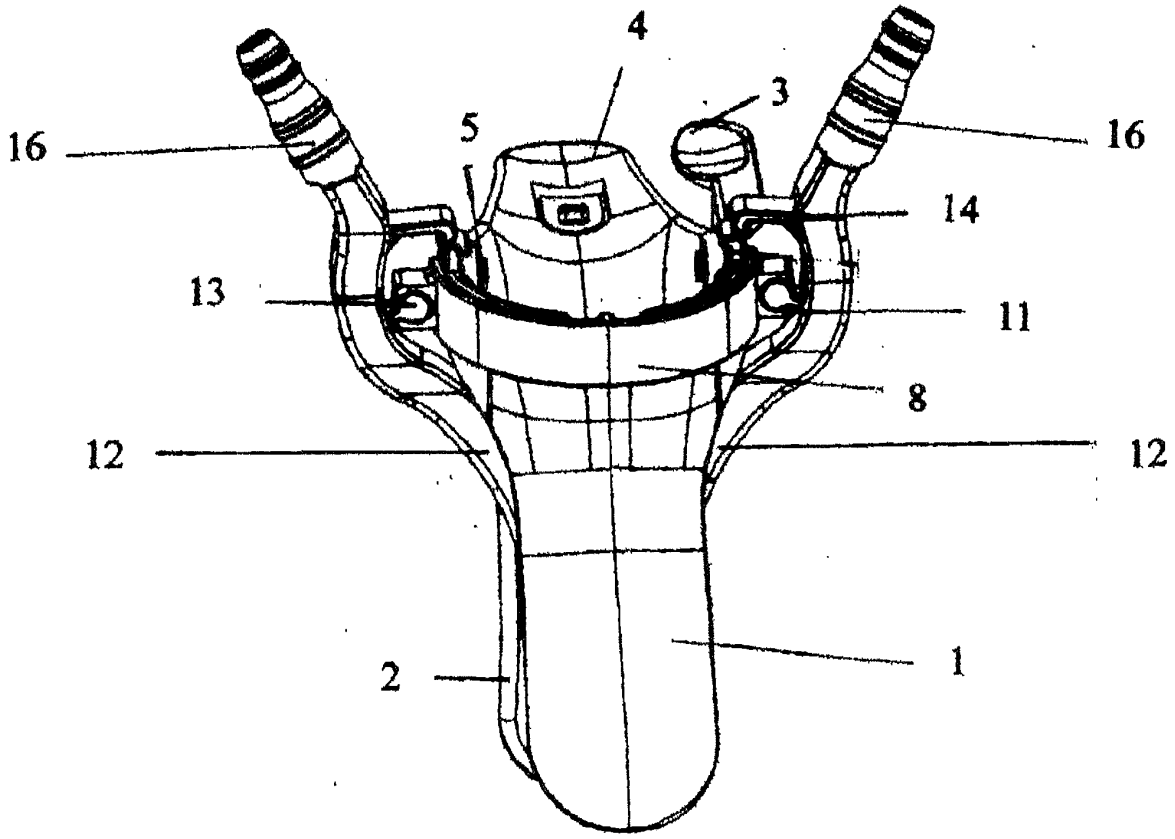

Fig. 2

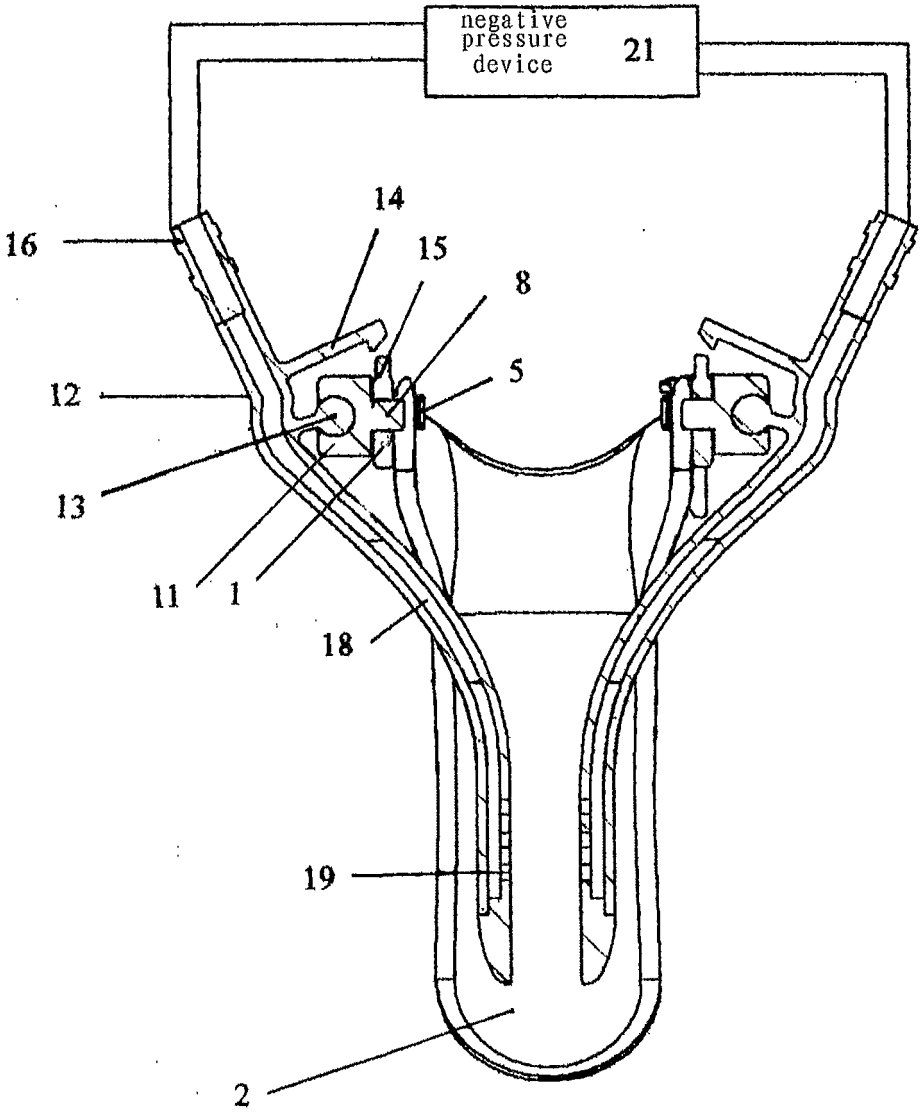

Fig. 3

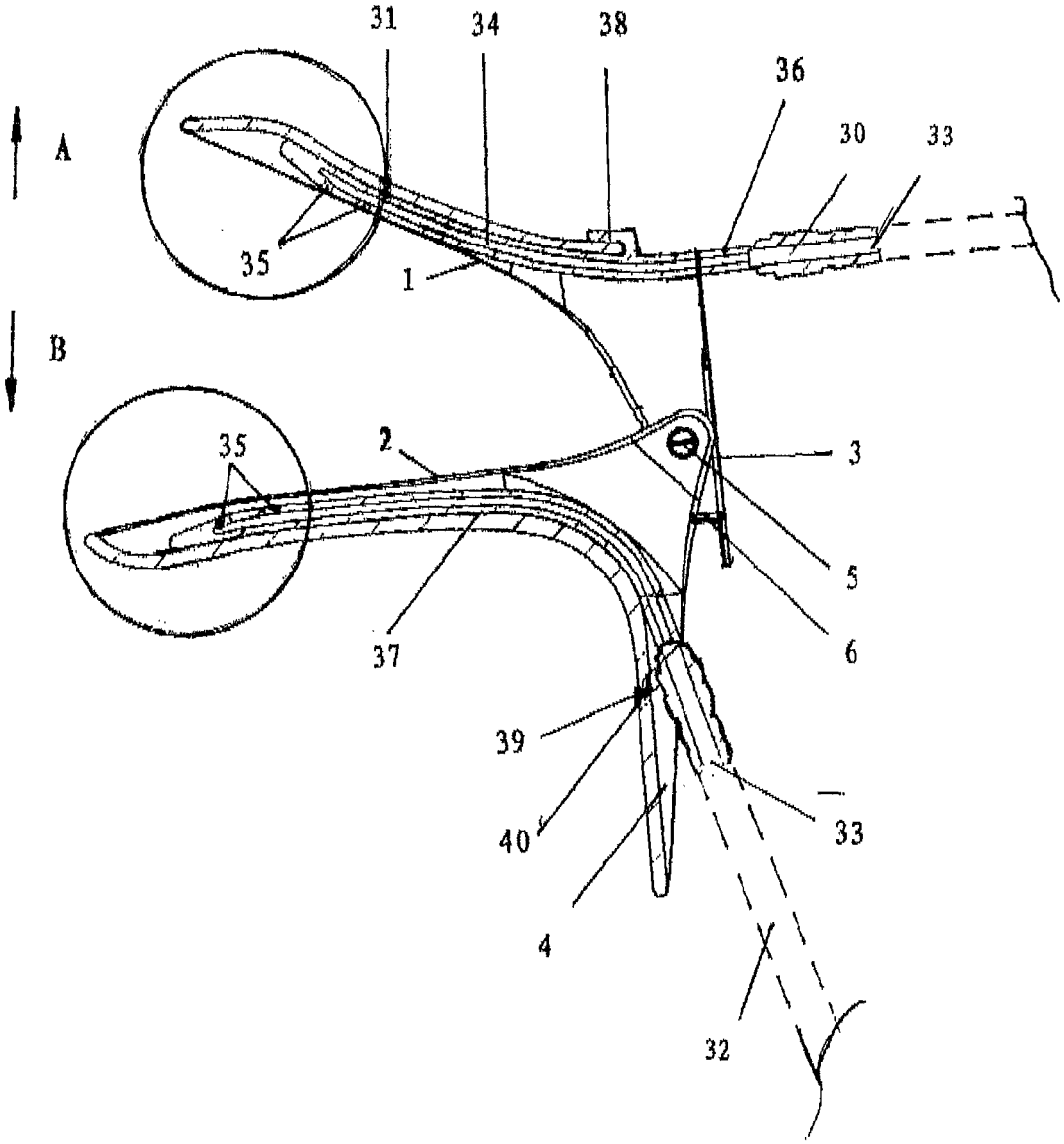

Fig. 4

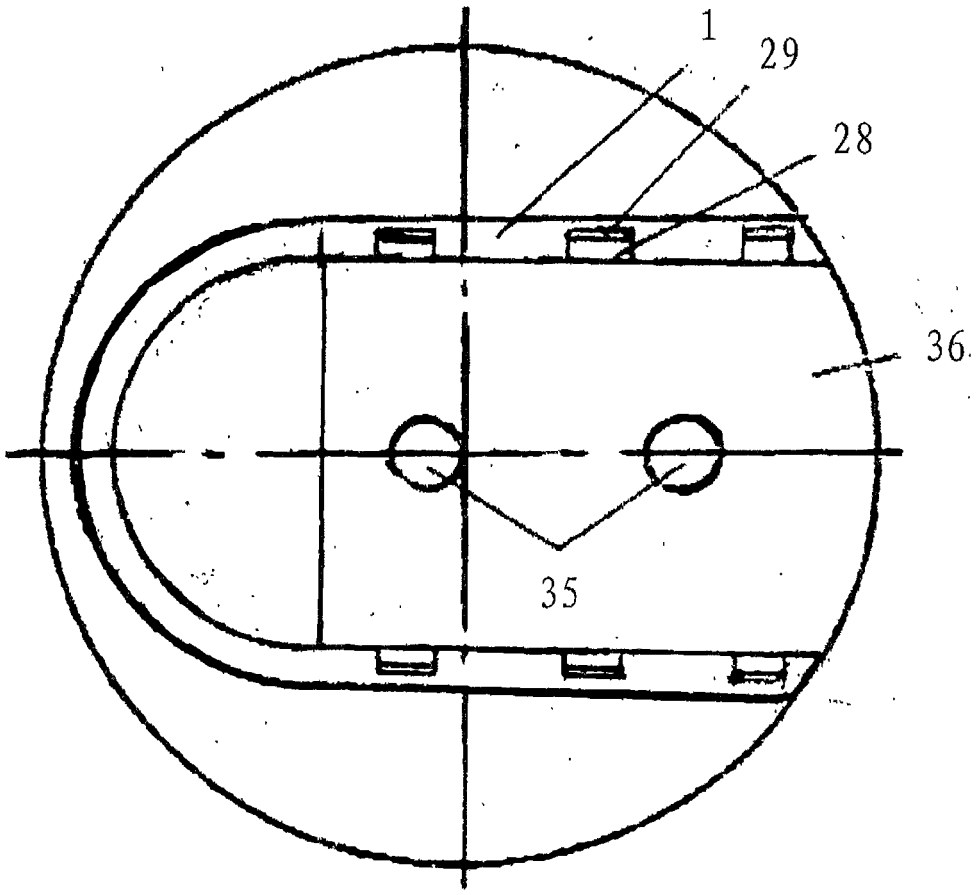

Fig. 5

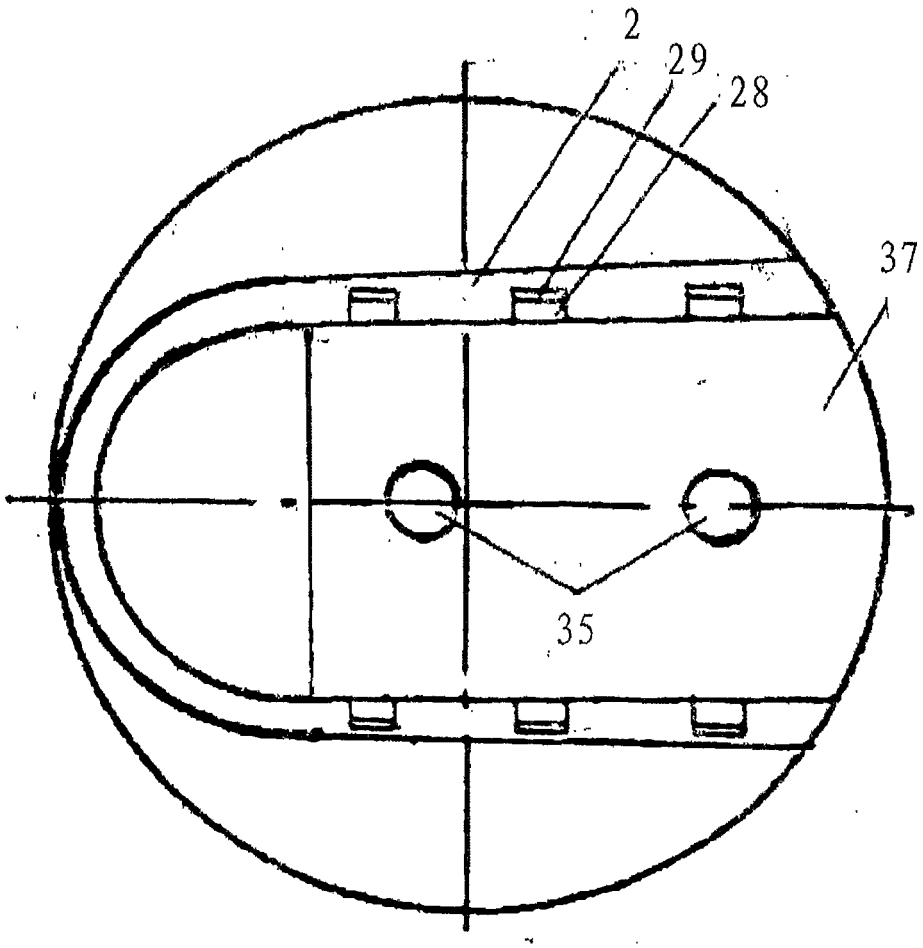

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2011/076317

A. CLASSIFICATION OF SUBJECT MATTER

See Extra Sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A61M29 A61B1 A61B17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS VEN DWPI CNKI
vagina? cervix gynaeco+ female speculum dilat+ retract+ expand+ lateral assist+ accessorial assistant wall secondary adjuvant transvers+ side? blade? wing? limb? vane? smoke smog fume exhaust+ vent pipe passage channel tube

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN101869735A (SHANGHAI LINJING MEDICAL EQUIPMENT CO., LTD.), 27 Oct.2010 (27.10.2010), claims 1-13, paragraphs [0007]-[0031] in the specification, figures 1-3.	1-14
PX	CN201735046U (SHANGHAI LINJING MEDICAL EQUIPMENT CO., LTD.), 09 Feb.2011 (09.02.2011), claims 1-13, paragraphs [0007]-[0031] in the specification, figures 1-3.	1-14
PX	CN101869736A (SHANGHAI LINJING MEDICAL EQUIPMENT CO., LTD.), 27 Oct.2010 (27.10.2010), claims 1-10, paragraphs [0007]-[0025] in the specification, figures 1-3.	15-23
PX	CN201735047U (SHANGHAI LINJING MEDICAL EQUIPMENT CO., LTD.), 09 Feb.2011 (09.02.2011), claims 1-10, paragraphs [0007]-[0025] in the specification, figures 1-3.	15-23

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 Agu.2011 (18.08.2011)	**13 Oct. 2011 (13.10.2011)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer SHAO,Jianxia Telephone No. (86-10)62085669

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2011/076317

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US6024696A (HOFTMAN M), 15 Feb.2000 (15.02.2000), the whole document.	1-23
A	CN201192334Y (LI, Ding), 11 Feb.2009 (11.02.2009), the whole document.	1-23
A	US6432048B1 (UNIV SOUTH FLORIDA), 13 Aug.2002 (13.08.2002), the whole document.	1-23
A	CN201061667Y (CHENG, Bo), 21 May 2008 (21.05.2008), the whole document.	1-23

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2011/076317

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101869735A	27.10.2010	None	
CN201735046U	09.02.2011	None	
CN101869736A	27.10.2010	None	
CN201735047U	09.02.2011	None	
US6024696A	15.02.2000	None	
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US6432048B1	13.08.2002	WO9966827A1	29.12.1999
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CN201061667Y	21.05.2008	None	

Form PCT/ISA /210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2011/076317

CLASSIFICATION OF SUBJECT MATTER:

A61M 29/00 (2006.01) i
A61B 1/32 (2006.01) i
A61B 17/42 (2006.01) i

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REFERENCES CITED IN THE DESCRIPTION

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